

preparing a synthetic resin polishing cloth in a circular form and a tool for forming a surface layer of the synthetic resin polishing cloth to have fluff thereon, said tool having an annular shape with a diameter less than a radial length of the polishing cloth, 5

rotating the polishing cloth along a central axis thereof and pressing the tool on one radial portion of the polishing cloth, said tool being moved along a radial direction of the polishing cloth and perpendicular to the radial direction to form the fluff on the polishing cloth, 10 and

rotating means for supporting the semiconductor device along a central axis thereof and pressing the semiconductor device on a different radial portion of the polishing cloth to polish the semiconductor device while 15 the tool is moved on the polishing cloth to recreate a surface shape thereof so that the polishing cloth can evenly and continuously polish the semiconductor device. 15

7. A flattening method as claimed in claim 6, wherein said fluff is formed on the polishing cloth continuously while polishing is being made by the polishing cloth, said fluff retaining abrasive particles therein for flattening the semiconductor device. 20

8. A flattening method as claimed in claim 6, wherein said polishing process is one of an initial stage of the polishing process, a middle of the polishing process, continuously during the polishing process, and before a termination of the polishing process. 25

9. A flattening method as claimed in claim 8, wherein said synthetic resin polishing cloth has a hardness of higher than 30 80 measured by a c scale according to JIS-6301.

10. A flattening method as claimed in claim 9, wherein said hardness is from 90 to 110.

11. A flattening apparatus of a semiconductor device by a 35 chemical-mechanical polishing process comprising,

a flattening device having a circular polishing cloth for 40 polishing the semiconductor device, said flattening device being rotated in one direction along a central axis thereof,

a device for forming a surface layer of the polishing cloth having fluff thereon, said forming device having an annular shape with a diameter less than a radial length of the polishing cloth, and 45

a tool arm connected to the forming device, said tool arm being moved along a radial direction of the polishing cloth and perpendicular to the radial direction to form the fluff on the polishing cloth while polishing is being made by the polishing cloth. 50

12. A flattening apparatus as claimed in claim 11, wherein said device for forming the surface layer of the polishing cloth recreates a surface shape of the polishing cloth.

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13. A flattening apparatus as claimed in claim 12, further comprising means for supporting the semiconductor device, said supporting means and said device for forming the surface layer being located adjacent to the polishing cloth of the flattening device.
14. A flattening apparatus of a semiconductor device by a chemical-mechanical polishing process comprising,
- 10 a flattening device having a circular polishing cloth for polishing the semiconductor device, said flattening device being rotated in one direction along a central axis thereof,
- 15 means for supporting the semiconductor device situated at a side facing the polishing cloth of the flattening device, said supporting means rotating along a central axis thereof and pressing the rotating semiconductor device on a radial portion of the polishing cloth, and
- 20 a device for recreating a surface shape of the polishing cloth disposed adjacent to the supporting means to face the polishing cloth, said recreating device having an annular shape with a diameter less than a radial length of the polishing cloth, and a surface shape recreating face with a curvature in a radial direction thereof to which the semiconductor device slidingly contacts and being actuated while the semiconductor device is being polished by the flattening device to recreate the polishing cloth continuously.
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- 30 15. A flattening apparatus as claimed in claim 14, wherein said recreating device forms a surface layer to have fluff thereon while recreating the surface shape of the polishing cloth.
- 35 16. A flattening apparatus as claimed in claim 15, wherein said recreating device is a tool including diamond abrasive grains.
- 40 17. A flattening apparatus as claimed in claim 15, wherein said surface shape recreating face of the recreating device includes diamond abrasive grains.
- 45 18. A flattening apparatus as claimed in claim 15, wherein said recreating device operating as the forming device is made of ceramic.
19. A flattening apparatus as claimed in claim 15, wherein said surface layer of the recreating device is made of ceramic.
- 50 20. A flattening apparatus as claimed in claim 19, wherein said surface layer made of ceramic is fixed with diamond.
21. A flattening apparatus as claimed in claim 19, wherein said surface layer of the recreating device includes a plurality of projections.

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